

"Dealing with Monopoly in International Telephone Services: A U.S. Perspective. *Information Economics and Policy*, No. 4. (1989-91).

"The Use of Excess Capacity in Overseas Telecommunications to Deter Competitive Entry," *Telecommunications Policy*, September 1989.

"International Telecommunications: Issues and Possible Solutions" in *New Directions in Telecommunications Policy*, Paula Newberg [ed.], Duke University Press, June 1989.

"Excess Capacity in International Telecommunications," *Telecommunications Policy*, September 1987.

"Public Utility Rate-of-Return Regulation: Can It Ever Protect Customers? Comment," in *Unnatural Monopolies*, R. W. Poole (ed.), D.C. Heath, 1985.

"Regulation of Broadcast Station Ownership; Evidence and Theory" in *Video Media Competition: Regulation, Economics, and Technology*, Columbia University, 1985.

"Why Telephone Rates Are Rising," *Regulation*, July-August 1982.

Competition, Cross Subsidies, and Residential Telephone Access" in *Policy Research in Telecommunications*, Vincent-Mosco (ed.), 1984

"Economic Implications of Mandated Efficiency Standards for Household Appliances: Comment," (with Stanley M. Besen). *Energy Journal*, October 1981

"Equity and Efficiency in the Telephone Industry: Comments," *Conference Proc. of the Michigan State University Institute of Public Utilities*, 1981.

"The Sustainability of Monopoly in Electronic Mail Service," *Perspectives on Postal Service Issues*, American Enterprise Institute, May 1980

"New Issues in Telecommunications Regulation: Comments," *Issues in Public Utility Regulation*, Michigan State University, 1979.

"Boundaries to Monopoly and Regulation in Modern Telecommunications," in *Communications for Tomorrow*, (Glen O. Robinson, ed.), Praeger, New York, 1978.

"A Review of the Positions of AT&T and the FCC Regarding the Consumer Communications Reform Act of 1976," *Journal of Telecommunications Policy*, March 1977.

"Comment on the Pricing of Satellite Services in the International Telecommunications Industry," in Harry M. Trebing (ed.), *New Dimensions in Public Utility Pricing*, The Institute of Public Utilities, Graduate School of Business Administration Michigan State University, East Lansing, Michigan, 1976.

"Problems of Regulating Specialized Telecommunications Common Carriers," in *Refocusing Government Communications Policy*, Aspen Institute for Humanistic Studies, Washington, D.C., 1976. San Francisco, December 14, 1976.

"Distributional Effects of Regulation," in *Rate of Return Regulation*, Federal Communications Commission Future Planning Conference, July 1976

"Government Regulation and Technological Advance " in *RAND 25th Anniversary Volume*. The RAND Corporation. 1973

"Behavior of the Firm Under Regulatory Constraint: A Reassessment," *American Economic Review*, May 1973.

"Technical Advance and Market Structure in Domestic Telecommunications," *The American Economic Review*, May 1970.

"New Technology: Its Effect on Use and Management of the Radio Spectrum," *Washington University Law Quarterly*. Fall 1968.

"New Communications Technologies and National Security," *Adelphi Papers*, The Institute for Strategic Studies, March 1968.

"Joint Cost and Price Discrimination: The Case of Communications Satellites," *University of Chicago Journal of Business*, September 1961

"Behavior of the Firm Under Regulatory Constraint," *American Economic Review*, December 1962, (coauthored).

RAND Publications

U.S.-Japan Relations in Telecommunications Equipment Trade, MR-141-CUSJR, 1993.

Entry by Telephone Companies into Cable Television: Regulation, Competition, and Public Policy, MR-102-RC, 1993."

Common Carrier Video Delivery by Telephone Companies, R-4166-MF/RL, 1992.

Advances in Telecommunications Technologies That May Affect the Location of Business Activities, N-3350-SF, 1991.

Direct Broadcast Satellites: A Competitive Alternative to Cable Television? (with Deborah R. Castleman), R-4047-MF/RL, 1991.

Development of High Definition Television: A Study in U.S.-Japan Trade Relations, R-3921-CUSJR, June 1990

Residential Broadband Services by Telephone Companies? Technology, Economics, and Public Policy, (with David P. Reed), R-3906-MF/RL, June 1990.

Competition, Pricing and Regulatory Policy in the International Telephone Industry, R-3790, July 1989.

Price Caps in Telecommunications Regulatory Reform, N-2894-MF/RC, January 1989.

The Future of INTELSAT in a Competitive Environment, N-2848-DOS/RC, December 1988.

Use of Excess Capacity in International Telecommunications to Deter Competitive Entry, N-2792-MF, October 1988.

Telephone Assistance Programs for Low Income Households, R-3603-NSF/MF, February 1988.

Issues in International Telecommunications: Government Regulation of Comsat, R-3497-MF, January 1987.

Excess Capacity in International Telecommunications: Poor Traffic Forecasting or What? N-2542-MF, December 1986.

Compatibility Standards, Competition, and Innovation in the Broadcasting Industry, R-3453-NSF, November 1986, (with Stanley M. Besen).

Telecommunications Alternatives for Federal Users: Market Trends and Decisionmaking Criteria, R-3355-NSF, December 1985. (coauthored)

Incentives to Improve Electric Utility Performance: Opportunities and Problems, R-3245-RC, February 1985.

Regulation of Media Ownership by the Federal Communications Commission: An Assessment, R-3206-MF, (with Stanley M. Besen), December 1984.

Testimony and Exhibit (Arizona Public Service Rate Hearing), N-2191, September 1984.

Scientific and Technology Information Transfer: Issues and Options, N-2131-NSF, March 1984, (coauthored).

An Analysis of the Federal Communications Commission's Group Ownership Rules, N-2097-MF (with Stanley M. Besen), January 1984.

Competition and Cross-Subsidization in the Telephone Industry, R-2976-RC, December 1982.

An Economic Analysis of Leased Channel Access for Cable Television, (with Stanley M. Besen), R-2989-MF, December 1982.

After Energy Price Decontrol: The Role of Government Conservation Programs, (with Stanley Besen), N-1903-DOE, October 1982.

Cost-Benefit Analysis and Voluntary Safety Standards for Consumer Products, R-2882-ICJ, 1982.

An Analysis of the Department of Energy's Nonprice Regulation of Industrial Energy Use, (with David Seidman), N-1876-DOE, May 1982.

Domestic Common Carriers and the Communications Act of 1934, P-5798, April 1977.

Problems of Regulating Specialized Telecommunications Common Carriers, P-5638, May 1976.

Analysis of Federally Funded Demonstration Projects: Executive Summary, Final Report, and Supporting Case Studies, R-1925-DOC, and R-1927-DOC, respectively, April 1976, (coauthored).

Projecting the Growth of UHF Television Broadcasting: Implications for Spectrum Use, R-1841, February 1976 (with R. E. Park).

The Social Effects of Cable Television, P-5390, March 1975.

Expanding the Use of Commercial and Noncommercial Broadcast Programming on Cable Television Systems, R-1677-MF, January 1975.

The Cabinet Committee Report to the President on Cable Communications, P-5193, February 1974.

Cable Television: The Process of Franchising, R-1135-NSF, March 1973, (coauthored).

Cable Communications in the Dayton Miami Valley: Basic Report, R-943-KF/FF, January 1972.

Cable Communications in the Dayton Miami Valley: Summary Report, R-942-KF/FF, January 1972, (coauthored).

Cable Television and Higher Education: Two Contrasting Experiences, R-828-MF, September 1971.

Cable Television and Questions of Protecting Local Broadcasting, R-597-MF, October 1970.

The Future of Cable Television: Some Problems of Federal Regulation, RM-6199-FF, January 1970.

Communications Satellites and Telephone Rates: Problems of Government Regulation, RM-2845-NASA, October 1961.

BRIEFINGS, SEMINARS AND INTERVIEWS SINCE JANUARY 1989

"Price Cap Regulation," RAND Board of Trustees, Santa Monica, April 1989

"Price Cap vs. Rate of Return Regulation," Center for Advanced Study in Telecommunications, Ohio State University, Columbus, June 1989.

"Pricing, Competition, and Regulation in the International Telephone Industry," International Telecommunications Symposium, International Center for Telecommunications Management, University of Nebraska, Omaha, June 1989.

"Future of Broadband Services to the Home," Annenberg School of Communications, USC, Los Angeles, February 1990.

"Deregulation of AT&T," radio interview. Money Radio Network, (20 affiliates nationwide), March 1990.

"Pricing and Regulation in the International Telephone Industry," Seminars in Regulatory Economics, Tucson, Arizona, April 1990.

"Residential Broadband Service by Telephone Companies," ICA/SuperComm '90 Convention, Atlanta, Georgia, April 1990.

"Price Reductions by AT&T," radio interview, Money Radio Network, June 1990.

"Price Cap Regulation," Telecommunications Reports Conference, Washington, D.C., July 1990.

"Telephone Company Entry into Cable Television," National Association of Regulatory Commissioners, Los Angeles, California, July 1990

"IBNs and Direct Broadcast Satellites: Competitors to Cable TV"? American Enterprise Institute, Washington, D.C., October 1990.

"International Telecommunications Services," Center for International and Strategic Studies, Washington, D.C., October 1990.

"Regulatory Constraints on the Bell Companies," radio interview, Money Radio Network, October 1990.

"Broadband Services by Telephone Companies. A Competitor to Cable TV"? Executive Briefing, Fiber in the Local Loop sponsored by Lightwave Journal, Stanford, Calif., December 1990.

"Policy Issues in Telecommunications," panel discussion, Government Accounting Office, Washington, D.C., February 1991.

"Telephone Company Entry into Cable Television," Columbia University, Telecommunications Conference, Washington, D.C., February 1991.

"Price Cap Regulation: Opportunities and Problems." Telecommunications Reports, Conference, Washington, D.C., May 1991.

"The Potential for Competition with Cable Television." Jones Intercable Conference, Vail, Colorado, August 1992.

"The Future of Wireless Cable." Annual Meeting Wireless Cable Television Association, Orlando, Florida, August 1992.

"Technical Standards for High Definition Television: Comments," Telecommunications Policy Conference, Solomons, Maryland, September 1992.

"Fiber Perspectives: Where Are We Going? Panel Discussion, Supercom '93, Atlanta, Georgia, April 1993.

"The RBOC's Video Dialtone Proposals," Panelist National Association of State Utility Consumer Advocates Conference, St. Louis, MO, June 1993.

"Competitors to Cable Television" Seminar, American Enterprise Institute, Washington, D.C., October 1993.

"Competition in the Cable Television Industry" Seminar, Yale University School of Management, New Haven, Conn., November 1993.

"Cable Entry into Telephony, Comments," Telecommunications Policy Conference, Solomons, Maryland, October 1994.

"The Prospect for Competition in the Local Telephone and Cable Television Industries," seminar, Institute for Defense Analysis, Alexandria, VA, May 22, 1997.

CONSULTANCIES

Cox Enterprises, Inc.

Adephia Communications Corp.

Great Lakes Cable Coalition

Atlantic Cable Coalition

California Cable Television Association

New Jersey Cable Television Association

National Cable Television Association

New England Cable Television Association

Canadian Cable Television Association

CableLabs

Time Warner, Oceanic Communications

Cablevision Industries

Comcast Corp.

Wometco Cable

AGT Limited

AT&T
Southwestern Bell Mobile Systems
Cellular Telecommunications Industry Association
Interstate Natural Gas Pipeline Association
Ford Foundation
Arizona Corporation Commission

ORAL TESTIMONY

"Implementation of Regulatory Framework -- Local Interconnection and Component Unbundling," before the Canadian Radio-television Commission, September 3, 1996.

"Evaluation of the Beacon Initiative," before the Canadian Radio-television Commission, June 12, 1995.

"Application by Oceanic Communications to Provide Private Line Service in Hawaii," Hawaiian Public Utilities Commission, March 13, 1995.

"Telephone Company Entry into Cable Television," Before Senate Subcommittee on Communications, Senate Bill S-2800," printed in S. Hrg. 101-886, July 24, 1990.

"Incentive Regulation of Arizona Public Service" before the Arizona Corporation, September 1984.

"Government Regulation of Cable Television," before Subcommittee on Communications, Committee on Interstate and Foreign Commerce, U.S. House of Representatives, printed in Cable Television Oversight--Part I, 94th Cong., 2nd Sess

"Copyright and Distant Signal Importation by Cable Television Systems," before the Commissioners of the Federal Communications Commission, meeting en banc, 1970.

AFFIDAVITS, DECLARATIONS AND PREFILED TESTIMONY

New Jersey Bell, application to provide video dialtone service in Dover, New Jersey, W-P-C 6840, Affidavit, February 12, 1993 (on behalf of New Jersey Cable Television Association).

New Jersey Bell, application to provide video dialtone service in Dover and Florham Park area, W-P-C 6838, 6840, Declaration, September 29, 1993 (on behalf of New Jersey Cable Television Association).

Pacific Bell, applications to provide video dialtone service in four metropolitan areas, W-P-C 6913, 6914, 6915, 6916, Affidavit, February 7, 1994; Reply Affidavit March 10, 1994, Reply Declaration, January 5, 1995; Second Reply Declaration, January 19, 1995, Declaration April 7, 1995 (on behalf of California Cable Television Association).

Ameritech, applications to provide video dialtone service in five states, W-P-C 6926, 6927, 6928, 6929, 6930, Affidavit, March 10, 1994; Reply Declaration, June 28, 1994 (on behalf of the cable television associations of the five states).

Bell Atlantic, applications to provide video dialtone service in five regions, W-P-C 6912, 6966, Declaration, July 28, 1994; Reply Declaration, August 22, 1994 (on behalf of Atlantic Cable Coalition).

Ex Parte submission, Designing Safeguards Against Cross-Subsidization in Video Dialtone Services, Docket No. 87-266, October 3, 1994 (on behalf of Adelphia Communications Corporation, Cablevision Industries, Comcast Corporation, Cox Enterprises, Inc.)

Rebuttal Testimony, In support of Oceanic Communications Application for Certification from the Hawaii Public Utilities Commission, Docket No. 94-0093, December 16, 1994 (on behalf of Oceanic Communications).

Competition in Wideband Location Monitoring Systems, Motion of Southwestern Bell Mobile Systems, Inc., to accept Supplement to Reply Comments, PR Docket No. 93-61, October 1993, (on behalf of Southwestern Bell Mobile Systems).

An Assessment of the Beacon Initiative, Implementation of Regulatory Framework, Canadian Television Radio Commission, Telecom Public Notice CRTC 94-52, 94-56, 94-58, March 20, 1995 (on behalf of the Canadian Cable Television Association).

Declaration, Bell Atlantic Telephone Tariff FCC No. 10, CC Docket No. 95-145, November 30, 1995.

Declaration, Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1, December 8, 1995, Reply Declaration, January 8, 1996 (on behalf of the National Cable Television Association, New Jersey Cable Television Association and Adelphia Cable Communications).

Testimony, "Competitive Entry Prior to Rate Rebalancing," Implementation of Regulatory Framework -- Local Interconnection and Component Unbundling, Telecom Public Notice CRTC 95-36, January 26, 1996 (on behalf of the Canadian Cable Television Association).

Declaration, In the matter of Open Video Systems CS Docket No. 96-46, March 28, 1996 (on behalf of the National Cable Television Association).

Comments, "Allocating Common Costs to Avoid Cross-Subsidy and to Enable the Sharing of Benefits," May 29, 1996, CC Docket No. 96-112, Reply Comments, June 10, 1996 (on behalf of the National Cable Television Association).

Direct Testimony, Connecticut DPUC Investigation into the Southern New England Telephone Company Application For Approval to Offer Unbundled Loops, Ports, and Associated Interconnection Arrangements and Universal Service Fund, Docket No. 96-09-22, January 6, 1997 (on behalf of the New England Cable Television Association.)

September 1998

APPENDIX B

LOCAL COMPETITION USERS GROUP (LCUG)

SERVICE QUALITY MEASUREMENTS (SQMs)

August 28, 1998

Membership: AT&T, Sprint, MCI, LCI,
WorldCom

Version 7.0

Service Quality Measurements

Measurement Detail

Collocation Provisioning (CP)

Function:	Collocation Provisioning
Business Implications:	<p>CLECs need to receive timely responses describing the price and availability of collocation space and ontime provisioning of collocation arrangements. CLECs also need the timely offering of alternatives to physical collocation and virtual collocation.</p> <p>Where ILECs run out of physical collocation space, they may develop suitable space. CLECs also may prefer more cost-efficient alternatives that afford control over their own equipment and may seek alternative arrangements from ILECs. The speed at which these alternative arrangements (i.e. leasing GR-303 compliant access concentration equipment as an unbundled network element or backhauling to a neighboring central office) are offered and provided also is critical to CLECs obtaining a meaningful opportunity to compete in local markets.</p>
Measurement Methodology:	<p>Mean Time To Respond To Collocation Request = $\Sigma [(\text{Request Response Date}) - \text{Request Submission Date}] / \text{Count of Request Responses Issued}$</p> <p>Mean Time To Provide Collocation Arrangement = $\Sigma [(\text{Date \& Time Collocation Arrangement is Complete}) - (\text{Date \& Time Collocation Application Submitted})] / \text{Number of Collocation Arrangements Completed}$</p> <p>% Due Dates Missed = $(\text{Number of Orders Not Completed By ILEC Committed Due Date}) / \text{Total Number of Orders Completed During the Reporting Period}$</p> <p>For CLEC Results:</p> <p><u>Mean Time to Respond to Collocation Request:</u> The response interval for each space request is determined by computing the elapsed time from the ILEC receipt of a collocation request (or inquiry) from the CLEC, to the time the ILEC returns the requested information or commitment to the CLEC. Elapsed time is accumulated for each type of collocation space request, and then divided by the associated total number of collocation requests received by the ILEC during the report period.</p> <p><u>Mean Time To Provide Collocation Arrangements:</u> The interval is the elapsed time from the ILEC's receipt of an order for collocation (from the CLEC) to the ILEC's return of a valid completion notification to the CLEC. Elapsed time for each order is then divided by the associated total number of collocation orders completed within the reporting period for each type of collocation. The measurement is similar to the Average Completion Interval for resold services and unbundled network element orders and could be reflected as a separate category of that measurement.</p> <p><u>% Due Dates Missed:</u> For each type of collocation, both the total numbers of orders completed within the reporting interval and the number of orders completed but missing the committed due date (as specified on the initial confirmation returned to the CLEC) are counted. The resulting count of orders completed later than the committed due date is divided by the total number of orders completed. The measurement is similar to the % Completed on Time for resold services and unbundled network element orders and could be reflected as a separate category within the % Completed on Time measurement.</p> <p>For ILEC Results: The ILEC computation is identical to that for the CLEC for provision of collocations to ILEC affiliates. Largely, however, tariff and contract standards will be the benchmarks that ILECs must meet for a parity determination.</p>

Service Quality Measurements Measurement Detail

<p>Their vast number of end offices compared to CLECs' switch deployment make it difficult to develop the appropriate analog.</p> <p>Other Clarifications and Qualifications:</p> <ul style="list-style-type: none"> • Elapsed time is measured in days and hours. • A response to the collocation request will only be considered to be "received" if it is a thorough and actionable plan (i.e., a simple "yes" or "no" is not sufficient). • Questions about the CLEC's collocation request also do not count as a "received response." 	
Reporting Dimensions:	Excluded Situations:
<ul style="list-style-type: none"> • Company • Type of Collocation • Geographic Scope 	<ul style="list-style-type: none"> • CLEC cancellations or requested delays.
Data Retained Relating To CLEC Experience:	Data Retained Relating To ILEC Performance:
<ul style="list-style-type: none"> • Report Month • Request Identifier (e.g., unique tracking number) • Date and Time of Request receipt by ILEC. • Request type (per reporting dimension) • Response Date and Time • Committed Delivery Date and Time • Actual Delivery Date and Time • Response Date and Time • Geographic Scope 	<ul style="list-style-type: none"> • Report Month • Request Identifier • Date and Time of Request Receipt by ILEC • Response Date and Time • Committed Delivery Date and Time • Actual Delivery Date and Time • Geographic scope
Performance Standard in Absence of ILEC Results	<p>If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:</p> <ul style="list-style-type: none"> • All responses must be provided in 5 business days unless contract/tariff interval is shorter. • All collocations must be provided within the applicable contract or tariff intervals. • No less than 98% of commitments must be met for Physical, Virtual and other alternative collocation offerings